

AD-A053 518

IOWA STATE UNIV AMES

F/G 5/10

THE EFFECT OF WRITING STYLE AS MEASURED BY THE FLESCH READING E--ETC(U)

1976

R A GRUBB

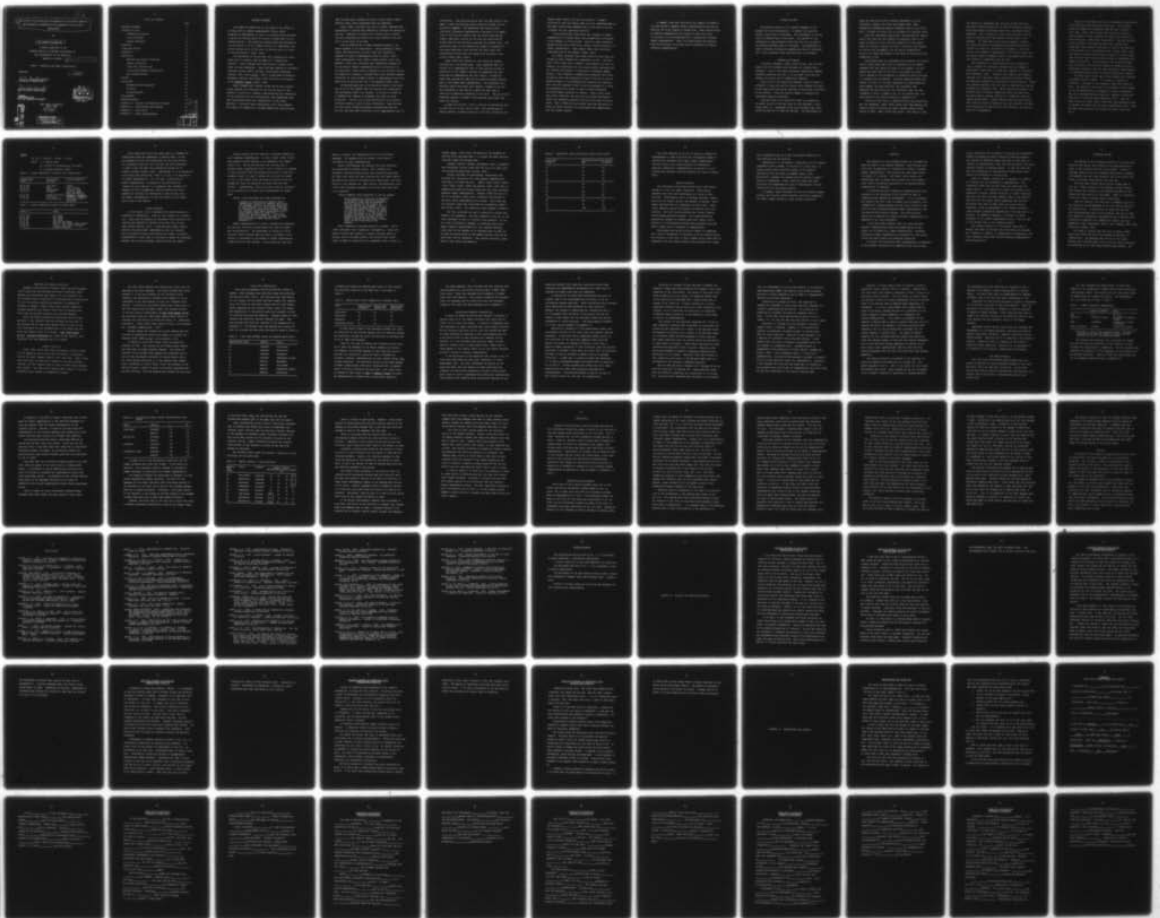
UNCLASSIFIED

NL

AD
A053 518

OF

21





AD No. _____
DDC FILE COPY

AD A 053518

1

DISTRIBUTION STATEMENT A

Approved for public release,
Distribution Unlimited

DDC
RECEIVED
MAY 3 1978
A

①
⑥ The effect of writing style as measured by the Flesch Reading Ease Formula on comprehension as measured by the Cloze procedure.

by

⑩ Ronald Allan/Grubb

A Thesis Submitted to the
Graduate Faculty in Partial Fulfillment of
The Requirements of the Degree of
MASTER OF SCIENCE

⑨ Master's thesis

Major: Journalism and Mass Communication

Approved:

⑫ 104 p.

J. K. Huistendahl
In Charge of Major Work

J. W. Schwartz
For the Major Department

P. A. Harris
For the Graduate College

DDC
RECEIVED
MAY 3 1978
RECEIVED
A

Iowa State University
Ames, Iowa

⑪ 1976

NO. 1
FILE COPY

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

389 283

hb

TABLE OF CONTENTS

	Page
PROBLEM STATEMENT	1
THEORETICAL BASE	6
Readability Formulas	6
Cloze Procedure	14
Reader Variables	19
OBJECTIVE	21
LITERATURE REVIEW	23
HYPOTHESIS	25
METHODOLOGY	26
Material and Subject Selection	27
Formula Selection	27
Cloze Test Construction	29
Survey Questionnaire Construction	31
Test Administration	36
RESULTS	38
CONCLUSIONS	46
Tendencies and Discussion	46
Critique	51
Future Research	53
BIBLIOGRAPHY	55
ACKNOWLEDGEMENTS	60
APPENDIX A: ORIGINAL AND REWRITTEN PASSAGES	61
APPENDIX B: INSTRUCTIONS AND EXAMPLES	76
APPENDIX C: CLOZE TESTS	81
APPENDIX D: SURVEY QUESTIONNAIRE	98

White Section	<input checked="" type="checkbox"/>
Soft Section	<input type="checkbox"/>
LABILITY CODES	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> A </div>	

PROBLEM STATEMENT

The study of readability is the study of the effect of writing style on reader comprehension (Klare, 1963). Readability measurement, as such, is a process which attempts to match the writing style of a piece of prose with its intended audience. This matching process makes two evaluations. One evaluation is of the reader's ability to comprehend; the second evaluation is of the style of writing used in a piece of written material (Chall, 1955).

The evaluation of the writing style (expressed as style difficulty) is usually done by means of a "readability formula". These formulas have been applied to almost every piece of prose imaginable. They have been applied to children's textbooks (Klare, 1963), military instructional materials (Bussey, 1970; Sticht et al., 1971), occupational information handbooks (Carlucci and Crissy, 1951) and even to anecdotes in the Reader's Digest (Klare, 1963).

These "readability" studies follow the pattern, methodology, whereby the difficulty of the writing style of the material is rated by a formula; upon achieving this evaluation of the difficulty of the writing style, the researchers then make conclusions about the "readability" of the rated material. Obviously these conclusions do not truly measure all aspects of readability, because readability involves more

than writing style; readability also involves reader comprehension, which these researchers have not measured.

Klare (1963) justifies this lack of reader comprehension measurement by stating that readability formulas are predictive devices. Formulas, he states, are intended only to predict how much comprehension difficulty a given audience will have with a given style of writing.

Are the predictions of these formulas accurate? The answer appears to be inconclusive. Some researchers, Klare, Brown, and Swanson and Fox have found that readability formulas do predict comprehension ability (Klare, 1963). Other researchers, Hites (1950), Dunlap (Klare, 1963), and Marshall (1956) have concluded that readability formulas do not accurately predict comprehension due to difficulty of writing style. Klare after reviewing all the validity studies on readability formulas, concluded that while formulas measure difficulty of style automatic gains in comprehension due to an easy style of writing are not to be expected (Klare, 1963).

The methodology used in the validity studies cited above may be one of the reasons that the results are inconclusive. The methodology used is as follows: An article is rated by a "readability" formula to determine the level of style difficulty. The article is then rewritten so as to yield a different (easier) level of style difficulty. Both articles are then given to matched groups of readers who read the article, and then take a multiple choice comprehension test on

the article. (The multiple choice test for each group is the same.) After the multiple choice tests are scored, the results are compared. The hypothesis that writing style difficulty influences comprehension is accepted if a comparison of test results reveals that the group receiving the easier, rewritten, version of the text did significantly better than did the group who received the original text. The predictive power of the readability formula is accepted if the group receiving a text written "at their level" did significantly better than the group which received a text written "above their level".

Lorge (1949) has pointed out that there are several problems with this methodology. Lorge suggested that the results of a comprehension test of this type are as much a reflection of the reader's ability to comprehend the test questions as comprehending the text itself. In addition Lorge also pointed out that the test questions might require more of the reader than comprehension. Test questions on a multiple choice test might well require a reader to use the data presented in the text as a basis for some type of inductive or deductive reasoning on the test. The use of this reasoning process to answer a test question also might confound the results.

Coleman and Miller's (1968) criticism of methodology used is that the use of any type of read - test methodology by asking readers to answer questions on the text introduces the

"memory span" factor into the test results. Coleman's criticism is that the subject must not only comprehend what he has read, he must also remember what he has read to be able to answer the test questions correctly.

In the methodology noted above any increase in reader comprehension of textual matter was automatically attributed to the changes in writing style. There are other variables beside writing style difficulty, however, which contribute to reader comprehension. Klare labels these other variables, "considerations of the reader" (Klare, 1963).

The reader variables that Klare refers to have been considered by other readability researchers as well. Dale and Chall (1949) found that a reader's intelligence, his skill in reading, his experience with the subject matter discussed and his interest and purpose in reading all influenced comprehension. Past research in readability recognized that these influences exist and attempted to nullify them by the use of matched groups, or by presenting the subjects with material that they were assumed to have no prior knowledge of or both. The assumption that either or both of these techniques nullified reader variables is tenuous. Klare (1963) notes that given sufficient time and with the proper motivation a reader can comprehend material written in the most difficult style. Kearl (1948) has also stated that high motivation to learn can offset deficits in intelligence and unfamiliarity with the subject matter.

In summary, some past studies on the subject of readability have failed to measure reader comprehension at all and as such are not truly studies of readability. Other studies which did measure comprehension are subject to some very valid criticism as to the methodology used to measure and evaluate reader comprehension. These criticisms prompt the question: Does the difficulty of writing style as measured by formula influence comprehension?

THEORETICAL BASE

The question raised in the problem statement is the purpose for this investigation. To answer this question several topics must be discussed. The measurement of writing style by formulas must be discussed. The measure of comprehension by some procedure other than the one outlined in the problem statement must be discussed. The measurement of reader variables influencing comprehension must be discussed, and a tool to measure these variables must be developed.

Readability Formulas

"Certainly formulas," Klare (1963) writes, "are the best known of all the products and outcomes of...readability...research." With no less than thirty-one readability formulas presently available for use, it is not hard to see why the formula is closely tied to readability research.

While each of the thirty-one formulas listed by Klare is different in some way from the others, most formulas do evaluate writing style difficulty, and only writing style difficulty, by two factors. These two factors common to formulas are: vocabulary load and structure.

Gray and Leary first identified these two elements as the major factors of writing style in 1938 (Marshall, 1956). Lorge (1944) in a subsequent study also concluded that style difficulty was due to these two factors. The measurement of

these two factors and their relative importance to style difficulty, however, has never been agreed upon. Most readability researchers measure vocabulary load in one of two ways: By means of a word list or by means of a syllable count.

Word list proponents (Dale-Chall, Wheeler-Wheeler, Spache, Dolch) hold that the best measure of vocabulary load is the count of words in a text that are unfamiliar to the reader. Under this theory a reader will have a difficult time reading an article, and presumably will not easily comprehend an article if a large percentage of the words in that article are unfamiliar to him.

Accordingly word list proponents have compiled lists which reflect those words that occur so frequently in the English language that they should be known to all readers. By comparing the words used in the text to the words on a word list a measure of the proportion of unfamiliar words contained in a passage can be obtained. The more unfamiliar words contained in a text; or the more frequently the same unfamiliar words appear; the more difficult the vocabulary load. Naturally the more difficult the vocabulary load, the less "readable" a text is judged to be, or, put another way, the more difficult the style of writing is judged to be.

The use of word lists in judging writing style difficulty has its drawbacks. Klare (1963) states that when dealing with specific types of writing (by topic) special subject lists should be used. Klare (1963) also notes: "The source of the

list should be considered; the list size should vary with the user's need; and words not on the list should be studied." Aside from Klare's criticisms there are a few other obvious drawbacks. One, of course, is that lists may have to be updated to keep pace with the addition of new words to the language. The Dale-Chall word list, for example, includes the words battleship, schoolmaster and airship but does not include the words jet, television or astronaut. Then too, there is the element of practicality. The use of a word list can easily become a ponderous task if the person using a word list formula is unfamiliar with the list.

The alternative to using word lists was introduced in 1930 by Johnson who presented evidence that the number of polysyllabic words used in a text was a measure of vocabulary load (Marshall, 1956). Johnson's work however went largely unheeded until 1948 when Flesch presented his second formula for measuring readability (difficulty of writing style). Flesch like Johnson decided to use the count of polysyllabic words as a measure of vocabulary load. While counting syllables is not directly akin to counting unfamiliar words, the same basic principle applies because difficult or unfamiliar words are usually polysyllabic. Flesch reasoned that the more polysyllabic words an article contained, the more difficult the style of writing would be, and thus the more difficult the article would be to comprehend.

The use of a syllable count as an alternative obviates the criticisms that were leveled at word lists. But syllable count as a measure of vocabulary load has had its share of criticism. Kearl (1948) stated that the use of syllable count assumes a linear relationship between word length and word difficulty. Kearl asks the question: Does the addition of one syllable to an eight syllable word increase the vocabulary load or style difficulty, as much as the addition of one syllable to a two syllable word? Taylor (1953) noted that under a syllable count method, abstract but short words like "id" and "ego" would be rated as easy to understand when indeed they are not. (Id and ego are not on the Dale-Chall word list and as such would be counted as unfamiliar words.) Nonetheless syllable count has been accepted by some readability researchers and is used in several readability formulas.

The other major factor used in most readability formulas is average sentence length. It is used as a measure of structure. Structure is the framework from which words are hung. The measure of structure is the measure of the complexity of the presentation of concepts in a piece of material. The use of average sentence length as a measure of structure dates back to Gray and Leary (Marshall, 1956). Gray and Leary as well as Lorge (1944) found that long sentences tended to present the reader with too much information at once. Much the same conclusion has been reached by Weaver (1965) who said:

We know that long messages...cannot remain intact because they exceed the capacity of immediate memory and of necessity must be processed as parts of the sequence.

Flesch concluded basically the same thing as Weaver, in 1948. Flesch moreover insisted on the relative importance of structure in measuring readability. Lorge had stated that vocabulary load was the most important factor, in estimating style difficulty. Flesch believed that structure was the most important, and his research indicated that the most consistent predictor of comprehension difficulty among school-age and adult readers was the average sentence length of the article read (Marshall, 1956).

Regardless of the relative importance of structure in estimating readability the fact is that virtually all readability researchers agree that structure is an important factor in estimating the style difficulty of the writing used in an article.

Of all the possible factors that could be used to estimate style difficulty only vocabulary load, and structure, appear consistently throughout readability research. Not only are these two factors the ones used most often, they are also used most often together, and are the only two elements in use in the most popular, and most accurate formulas.

The use of these two elements in estimating style is usually done by the application of a regression equation and a conversion chart (Klare, 1963). The process works as follows:

The vocabulary load and structure of a piece are calculated by the counting the frequency of occurrence of unfamiliar words, or by counting the number of syllables divided by the number of words, in an article; and by dividing the number of total words by the number of sentences in an article. These two totals, percent of uncommon words or number of syllables per one-hundred words, and average sentence length are then inserted into a readability formula (a given equation). The equation is then solved for X, where X is the "readability score". The resultant number (X) is then compared against a chart, which is given along with the formula. The chart gives a style difficulty rating or school grade level for the number (X). Most readability formulas give a school grade level which is to be interpreted as the education level that a reader must have to comprehend the style of writing used in the rated work (Klare, 1963). While Flesch also provides a school grade level chart, he prefers that his readability scores be evaluated by means of a chart which gives a range of scores, a description of the style that would produce that score, and an example of a magazine that uses that particular style (Flesch, 1951). The formulas and charts for both the Dale-Chall and Flesch formula are given in Tables 1 and 2.

Dale-Chall

$$X = .1579x_1 + .0496x_2 + 3.635$$

Where: X = readability

x_1 = percentage of words not on Dale
list of 3000

x_2 = average sentence length

3.635 = constant

Table 1. Dale-Chall readability index

Formula Score = X	Corrected Grade Levels
4.9	4th Grade
5.0 to 5.9	5-6 Grade
6.0 to 6.9	7-8 Grade
7.0 to 7.9	9-10 Grade
8.0 to 8.9	11-12 Grade
9.0 to 9.9	College
10.0 Above	College Graduate

Flesch

$$(X) R.E. = 206.835 - .846w_1 - 1.015s_1$$

Where: X = Reading Ease

w_1 = number of syllables per 100 words

s_1 = average sentence length

Table 2. Flesch readability index by style description

Reading Ease Score = X	Description of Style	Typical Magazine
90 to 100	Very Easy	Comics
80 to 90	Easy	Pulp fiction
70 to 80	Fairly Easy	Slick fiction
60 to 70	Standard	Digests, Time, Mass non-fiction
50 to 60	Fairly Difficult	Harper's, Atlantic
30 to 50	Difficult	Academic, Scholarly
0 to 30	Very Difficult	Scientific, Professional

Table 3. Flesch readability index by school grade

Score = X	Grade
90 to 100	5th Grade
80 to 90	6th Grade
70 to 80	7th Grade
60 to 70	8th and 9th Grade
50 to 60	10th to 12th Grade (high school)
30 to 50	13th to 16th Grade (college)
0 to 30	College Graduate

After completion of all the steps used in a readability formula what does the researcher or analyst have? He has an evaluation of the style difficulty of the rated article. This evaluation does not tell him that the style evaluated is good or bad, nor does this evaluation portend to be totally accurate (Klare, 1963). Nonetheless it is an evaluation of writing style difficulty. What it is not is an evaluation of reader comprehension. It is at best a prediction of reader comprehension. According to the definition of readability given earlier it is apparent that "readability" formulas do not of themselves indicate readability since readability involves the evaluation of both writing style and reader comprehension, so that the effect of the former can be seen on the latter.

Cloze Procedure

In 1953 Taylor (1953) introduced the Cloze Procedure as a measure of readability. Cloze is not a measure of readability. Cloze does not measure or calculate style difficulty, by counting the elements or factors of writing style or any other method (Taylor, 1953). Cloze measures reader comprehension; the same reader comprehension that the formulas which calculate writing style difficulty attempt to predict. Comprehension in each case is the state or degree of isomorphy, reached via a written passage, between writer and reader.

Taylor decided that the best way to measure readability was to measure comprehension. In fact, Taylor (1956) stated that readability was assumed to be synonymous with comprehensibility. Taylor also decided that the best way to measure reader comprehension was to test a reader on a passage by deleting words from that passage and replacing them with standard length (15 space) blanks; and then ask the reader to fill in the blanks using the words not deleted from the passage as clues for supplying the words that had been deleted. Comprehension, Taylor believed, would be indicated by the proportion of correct word replacements the reader made.

Taylor (1953) described the Cloze Procedure as:

A method of intercepting a message from a "transmitter" (writer or speaker) mutilating its language patterns by deleting parts and so administering it to "receivers" (readers or listeners) so that their attempts to make the patterns whole again potentially yield a considerable number of Cloze units.... A Cloze unit may be defined as: Any single occurrence of a successful attempt to reproduce accurately a part deleted from a "message"....

Reader comprehension of a text is measured by comparing the original text with the mutilated text that the reader has "reconstructed". The percentage of correctly "reconstructed" (exact deleted word put back in by reader) Cloze "units" is equivalent to the amount of reader comprehension (Cloze score) of that passage. Cloze scores are then com-

pared to evaluate the comprehensibility of two different passages. The passage with the highest Cloze score is considered the most comprehensible.

Taylor's methodology for applying the Cloze procedure was questioned on several points: Was a random, or a systematic deletion system better than preclassifying words as "easy" and "hard" and then deleting only the "hard" words? How many words should be deleted, and at what rate? How long should a Cloze passage be? When scoring "reconstructed" Cloze "units" were synonyms acceptable or did the exact word have to be replaced?

Taylor answered these questions in 1956 by saying:

There seems to be little or no advantage in preclassifying words and limiting deletions to them, and no advantage to putting oneself to the trouble of judging and scoring synonyms. Also it appears that an every fifth word deletion system spaces blanks as far apart as they need to be. Further, a series of about 50 blanks (e.g. 250 words) is roughly sufficient to allow chances of mechanically selecting easy or hard words to cancel out and yield a stable score of the difficulty of the passage.

Other researchers confirmed Taylor's findings. Potter (1968) concluded that a mechanical (systematic, - every nth) deletion system was superior to using a rational deletion system, since a rational system, that deleted only "hard" words, allowed the possibility of judgmental bias to enter in.

Bickley et al. (1970) after reviewing all the research on deletion rate concluded that a 1:5 (every 5th word) deletion rate was indeed the optimum rate.

Bormuth, Ruddell, Hafner, and Musgrave each in separate and independent studies found that the use of an exact word scoring system worked best (Potter, 1968).

Having confirmed the methodology, researchers then attacked the conclusion; did Cloze measure comprehension? Once again the answer was yes. Rankin (1959; 1965), Hafner (1965; 1966), Potter (1968) and Bormuth (1962; 1968) each in separate and detailed studies found that the Cloze procedure measured reader comprehension. Bormuth (1968) also went so far as to produce a table which converted Cloze-scores to multiple choice comprehension test scores. This study and the resultant table was replicated and validated by Rankin and Culhane (1969). The conversion table appears in Table 4.

The Cloze procedure as used in readability studies has, however, two drawbacks. The first drawback to the use of the Cloze procedure is that it involves field research. To use the Cloze to evaluate a passage, a researcher must have a sample audience representative of the intended audience. Cloze tests on the passage to be evaluated must be made up, printed and administered to the sample audience, and the results must then be tabulated. This process involves a great deal of time, money and manhours.

Table 4. Equivalent Cloze and multiple choice test scores

Cloze Test Scores %	Multiple-Choice Test Scores	
	Raw	Corrected
19	50	33
23	55	40
27	60	47
31	65	53
35	70	60
38	75	67
42	80	73
46	85	80
50	90	87
53	95	93
57	100	100

The other drawback to the use of Cloze as a measure of comprehension is that Cloze does not discriminate among or identify the variables which cause reader comprehension.

"One can think of the Cloze procedure as throwing all potential readability (comprehension) influences in a pot letting them interact, and then sampling the result" (Taylor, 1953).

Reader Variables

The influences, aside from writing style, that Taylor "throws in a pot" are reader variables. These reader variables have been noted previously in a quote by Dale. They are: intelligence, skill in reading, maturity, experience with the subject matter, and purpose in reading. These reader variables are not independent of each other. Klare (1963) combines reader intelligence and maturity into one variable. The first three variables are closely intercorrelated among pre-adult readers. This intercorrelation degenerates somewhat as readers grow older (Klare, 1963). Despite the intercorrelation among these variables each may exact a great deal of influence on comprehension.

Intelligence and maturity allow a reader to compensate for a lack of background or experience with the subject matter. The converse is also true in that a reader with a great deal of experience with the subject matter being presented can compre-

hend a passage as well as a more intelligent reader who is less familiar with the subject.

Reading skill or the reader's "experience with the English language" allows a reader, in the case of a Cloze test, to supply certain words correctly because of the reader's familiarity with the rules of grammar (Klare, 1963).

Motivation or purpose for reading also can affect a reader's ability to comprehend. Kearl (1948) has noted that high motivation can compensate for lack of intelligence, and for familiarity with the subject matter.

In summary, reader variables can and do influence comprehension, and "Strong" reader variables can and do compensate for "Weak" reader variables, under certain conditions.

OBJECTIVE

The objective of this research project is to answer the question asked in the problem statement: Does writing style difficulty as measured by a "readability" formula influence reader comprehension? This question has been asked before. The answer to it varies. The answer varies because the methodology used to answer this question can, and probably does, insert confounding influences on the process whereby comprehension is measured.

An alternate method of measuring comprehension has been presented in the discussion of the theoretical base of readability and readability measurement. If it is accepted, and research has been cited to promote this acceptance, that "readability" formulas measure writing style difficulty, and that the Cloze procedure measures reader comprehension, then the question and objective become: Does writing style difficulty as measured by formula influence comprehension as measured by the Cloze procedure?

It has been shown, however, that the Cloze procedure measures comprehension without discriminating as to the source of, or reason for, reader comprehension. Therefore attributing reader comprehension as measured by Cloze solely to writing style could be an erroneous conclusion.

To nullify the possibility that comprehension, as measured by any method, occurred due to something other than writing

style, researchers have attempted to equalize the differences between the groups by using a pairing or matching process. This pairing or matching process was used to hold other influences on comprehension, other than writing style difficulty, constant between the matched groups. In this way they felt that any differences in comprehension between groups could rightly be attributed to writing style.

There is, however, another way to approach the problem of filtering out the influences on comprehension. The influences, other than writing style, are those that the reader exerts. It is possible to survey the subjects of an experiment to assess "reader variables" in terms of how much education they have, how much reading they do, how familiar they are with the subject matter presented, and how much motivation they have to learn about the subject matter presented. After an assessment of the "reader variables" (other factors influencing comprehension) has been made it is possible, by regression analysis, to account for their influence on the overall comprehension score. This was part of the process used in this research project.

The overall objective of this project then, was to measure the effect of writing style difficulty, as measured by a readability formula, on comprehension as measured by the Cloze procedure, when other factors affecting comprehension were accounted for.

LITERATURE REVIEW

The purpose of this literature review is to review other projects that had as their objective the same objective as noted in the objective section of this paper. In fact, a thorough search of all the literature pertaining to readability formulas, and the Cloze procedure led to the belief that there is no other study exactly like this one.

There are many studies quite similar in many ways to this one. These studies, or the findings of these studies, have already been reported in the problem statement or the theoretical base section of this paper. There is, therefore, little or no need to restate each of them here.

There is, however, one study that is somewhat similar in both objective and methodology to this one, and as such will be reported here. It should also be noted that the fact that the methodology used in this research (the use of Cloze, as a method for evaluating comprehension due to writing style difficulty as measured by a readability formula) has been suggested by many researchers (Klare, 1963; Bormuth, 1967, 1968; Rankin and Culhane, 1969).

The study of interest here was done by Knight (1966). Knight used three 300 word Cloze passages as measures of comprehension. The passages were written at the ninth, twelfth, and fifteenth grade level of writing style difficulty as determined by the 1948 Flesch Reading Ease Formula. The

passages were extracted from the S.R.A. Occupational Information Kit, and given to students whose reading ability was within plus or minus .5 standard deviation of the ninth grade level as determined by the Metropolitan Achievement Test.

A fifty item Cloze test of each passage was given to each student. Exact word scoring (synonyms scored incorrect) was used. The results show significant differences, at the .05 level, between reader comprehension of materials written at the ninth and fifteenth grade level, and the twelfth and fifteenth grade level. "No significant differences in comprehension were found in the subjects performance on levels nine and twelve at the .05 level" (Knight, 1966).

Knight concluded that the Flesch formula did predict comprehension (writing style does influence comprehension) if the predictions are expressed in broad limits. While the conclusions reached by Knight are important, the real value of this research to the study at hand is that the methodology for testing comprehension due to writing style proposed in this study has been used before.

HYPOTHESIS

The hypothesis generated for this study should reflect the problem statement and objective for this study. Moreover, the hypothesis generated should reflect the sum of the statements made in the theoretical base. The hypothesis generated for this study was made in the null form since the research indicates that neither a positive or negative relationship always exists between the two variables, comprehension and writing style difficulty.

The hypothesis generated for this thesis was:

There will be no change in reader comprehension, as measured by the Cloze procedure, due to a change in the difficulty of writing style, as measured by a readability formula.

METHODOLOGY

Much of the methodology used to test the hypothesis has already been presented in other sections. The overall methodology used to test this hypothesis followed this procedure: Four passages were selected at random from a text. These passages were rated by the Flesch Reading Ease Formula to determine the style difficulty of the writing used in these passages. The passages were then rewritten using a less difficult style of writing to obtain higher (easier) readability scores. The four original passages and four rewritten passages were then made into Cloze tests. A sample audience was drawn at random from the available population. The subjects were given Cloze tests and a survey questionnaire to complete. The Cloze tests given to each reader were assigned at random. The mean scores on the Cloze tests over the two versions of the same passage were then compared. The t-test for significance was used to compare mean scores. The influence of reader variables on Cloze test (comprehension) scores was assessed via the data obtained through the survey questionnaire given to each subject. The specifics of this methodology outlined above will be explained immediately after an explanation of the material and formula used in this research project has been given.

Material and Subject Selection

Research cited earlier by Bussey (1970) and Sticht et al. (1971) noted that the writing style used in military field manuals and regulations was judged to be too difficult for the intended users or audience of those manuals and regulations. The use of military subjects and material in readability research is common. Klare (1963) notes several studies on military material, and Taylor (1953) did his original work with Cloze on military subjects, and military manuals.

Since the author through his affiliation with the Army was able to use subjects from the military for his test, it was decided that an Army Field Manual should be used as the text from which the test passages were to be drawn, and over which the subjects were to be tested. Army Field Manual 22-100: Military Leadership was chosen as the specific text from which the test passages were to be drawn.

Formula Selection

Klare (1963) notes that there are several reliable formulas for measuring the writing style difficulty of materials written for adult readers, which is the case here. Klare (1963) also notes that the Dale-Chall formula is the most accurate formula, but only slightly more so than the 1948 Flesch Reading Ease Formula. The 1948 Flesch Reading Ease Formula is the most frequently used formula in readability studies.

The 1948 Flesch Reading Ease Formula was chosen over the Dale-Chall and other formulas. The Flesch formula was chosen because it is the most accurate of the "syllable count" formulas, and because as a syllable count formula it is not vulnerable to the shortcomings of word list formulas noted earlier. In addition, the Flesch formula was chosen since it was the formula used by Knight (1966), and because authors of the new edition (unpublished) of Army Field Manual 22-100 are currently using the 1948 Flesch Reading Ease Formula to evaluate this new edition of FM 22-100 (Klien, R. Leadership Department. United States Army Infantry School, Fort Benning, Ga. Personal Communication. 1976.)

Another reason for choosing the Flesch formula was that its ease of application reduces the chance of clerical and biasing errors (Hayes et al., 1950; Marshall, 1956).

It should be noted that Flesch (1951) developed two formulas in 1948. One formula was the Reading Ease Formula, the other was the Human Interest Formula. The latter has received little acclaim from readability researchers and it has not been thoroughly evaluated or tested (Klare, 1963). For these reasons and since it is the Reading Ease Formula which, according to Flesch (1951), gives "an estimate of the ease with which a reader is going to read and understand what you have written," only the Reading Ease Formula was used here.

Cloze Test Construction

Four 250-word passages from FM 22-100 were chosen at random. These passages were rewritten along the guidelines provided by Flesch (1951). The sentences were kept short, but not choppy, and the words used were simple, not complex. Since the Flesch or any other formula does not take format, and/or organization into account (Klare, 1963), the format and organization of the material were held constant in both the original and rewritten passages. Passage length for both original and rewritten versions remained the same. (The four original and rewritten versions of the passages are in Appendix A.) The passage topic and Reading Ease scores for both the original and rewritten versions are shown in Table 5.

Table 5. Cloze test passage topics and Reading Ease scores

Reading Ease Score	Version	Topic
36	Original	Drug Abuse
43	Original	Motivation
44	Original	Endurance
52	Original	Leadership Styles
56	Rewrite	Endurance
64	Rewrite	Drug Abuse
67	Rewrite	Leadership Styles
73	Rewrite	Motivation

A comparison between the Reading Ease scores of the original and rewritten versions of the same topic is as shown in Table 6.

Table 6. Reading Ease scores comparison by passage topic

Topic	Reading Ease (Original)	Reading Ease (Rewritten)	Reading Ease Difference
Drug Abuse	36	64	28
Motivation	43	73	30
Endurance	44	56	12
Leadership Styles	52	67	15

In each case in Table 6 the difference between the style of difficulty of the original passage and the rewritten passage was sufficient to make the style of difficulty of writing less so by at least one category.

That is, the ease of reading was increased in each case, by at least one category on the Flesch Readability Indices. For example, the original passage on Drug Abuse was rated as written in a "difficult" style, as found in academic or scholarly journals, comprehensible to those readers having some college education. The rewritten version of that same passage yielded a reading ease score which indicated that a standard style of writing difficulty had been used. This style would be similar to that found in Time or Reader's Digest and would be comprehensible to people with a high school education.

The eight passages, four originals and four rewrites were then mutilated on a one-to-five deletion rate to make eight Cloze tests. These test passages were assembled in random order into test booklets. Each booklet contained two original Cloze test passages and two rewritten Cloze test passages. (Copies of the eight mutilated passages are in Appendix C.)

Survey Questionnaire Construction

A survey of reader attributes was designed to measure or provide input as to the reader variables that could have an effect on the Cloze test scores. It should be remembered from the discussion on reader variables that these reader variables are not mutually exclusive, and as such the evaluations made of these variables as measured by this questionnaire may not yield precise data on each variable as a separate entity. However, it is not the exact and exclusive impact of each specific variable that is being sought here, rather what is being gauged is the overall effect of all the reader variables acting in concert to produce comprehension.

In the discussion of the questions that follow it will be noted that some questions have been "collapsed" to form a measurement tool. The term "collapsed" as applied to the questions means that the answers to these questions were combined via statistical procedures to yield a single score which could be used in regression and correlation computations. These answers were combined after statistical analysis of the

questions revealed that combining them would yield a more efficient and comprehensive measurement tool than would be obtained by simply using each one separately.

It should also be noted that correlations are given to support some of the claims made with reference to the relationships between questions. These correlations were obtained while analyzing the data generated by these questions. However, the purpose in presenting the correlations here is not to preempt their inclusion in the results section but rather to show support for the rationale behind the use and explanation of these questions. (The questionnaire referred to in this section appears in Appendix D.)

Questions C1 through C6 of the questionnaire dealt with the reader's opinion of the Cloze texts the subjects read and completed. It was felt that by measuring reader opinion on the difficulty of the texts and comparing those opinions against the rated (by formula) difficulty of the text, a gauge or reader evaluation of text difficulty could be attained. Questions C1 through C6 were then, the first "set" of questions, and were to give an estimate of reader opinion of passage difficulty. In addition, it should be noted that Questions C1, C2 and C3 correspond roughly and respectively to Questions C4, C5 and C6. Strong correlations between the first three questions and the last three questions confirmed this correspondence. Correlations between C1 and C4, C2 and C5, and C3 and C6 were .83, .94, and .73, respectively.

Questions C7 through C12 were designed to measure the aspects of experience and motivation with regard to the topics presented in the Cloze Texts. The topics of the Cloze texts dealt primarily with the subject of leadership and/or some of the qualities or knowledge that a leader would have to possess to be effective. A short introduction to these questions included a definition of the terms "supervisor" and "leader", so as to preclude the possibility of conceptual difference among subjects as to the meaning of those terms as used in the questionnaire.

With respect to the questions themselves C7, C8 and C9 were designed to provide data on whether the individual concerned had any experience as a leader in the National Guard and whether he desired to be a leader in the National Guard. The corollary reader variable measured by these questions was reader experience with the subject matter and motivation to learn about the subject. These three questions were then combined with Questions C19-20 to yield a composite score which would measure a subject's leadership experience and motivation to be a leader. Question C19-20 was included in this composite score since in the National Guard rank is a pre-requisite for holding a leadership position.

Much of what was said in support of C7 through C9 can be said for Questions C10 through C12. These questions dealt with the subject's experience as a supervisor in a civilian job. While military leadership was believed to be different

that its counterpart in the civilian sphere, it is doubtless some experiences remain the same and thus allow the reader who has a civilian leadership job an "edge" in comprehending material on military leadership.

Questions C10 through C12 were, like Questions C7 through C9, collapsed to form a more efficient estimate of a subject's experience and motivation. For either set of questions as collapsed the range of responses could be from: "is not now, never was and has no desire" to be a leader, to: "is now, has been and does desire" to be a leader.

Questions C13 through C16 were designed to measure a reader's skill in reading. However, it is believed that Question C13 measures a different aspect of reading skill than the other questions. Question C13 was designed to be a measure of a subject's daily required reading. It was assumed that this type of reading is undertaken solely for the purpose of information gain. Information gain is comprehension plus retention of subject matter (Coleman and Miller, 1968). Since information gain is a function of comprehension, this question was assumed to measure a subject's ability to read material purely for comprehension. Logically, it was assumed that those who had experience in reading for this purpose would fare better on comprehension tests than those who had less experience at this type of reading task.

Question C13 alone however does not measure a reader's experience (hence possible skill) in reading. Reading skill can come simply from reading, regardless of what is read or the motivation behind reading. Thus the reader or subject whose job requires little or no daily reading may still be a skilled reader if he devotes time to reading books, magazines, and newspapers. It is not a requirement that a reader read all three of the above; reading any one or a combination of the three categories (books, magazines, or newspapers) can develop reading skill. In an effort to encompass all the possible different ways in which a reader could gain skill by reading the above, the answers to the three questions were combined; that is, the questions were collapsed into one overall measure of reading skill. The range of answers possible for the collapsed question ranged from reading no books and spending almost no time each day reading newspapers and no time each week reading magazines to reading five or more books a year, spending more than two hours each day reading newspapers and more than four hours each week reading magazines.

The question arises as to whether or not Question C13 should be combined with Questions C14 through C16. The answer appeared to be no. Part of the reason for this answer has already been given. Daily reading on the job is assumed to be a reader's (subject's) experience in reading material

for comprehension, while Questions C14 through C16 were a measure of the reader's overall reading skill or reading habits. The proof that these two measurements are somewhat different lies in the fact that their correlation is .45.

Questions C17 and C18 were designed to obtain a measurement of the subject's opinions of Army Field Manuals. These two questions, like Questions C1 through C6, were not designed to measure a reader variable. These questions were used to compare the subject's opinion of the difficulty level of Army Field Manuals with the education levels of the sample populace.

Questions C19-20, C21-22, C23-24, and C25 concerned the demographics of the sample populace; they were also used to measure some reader variables. Question C19-20 has already been discussed. Question C21-22 is a measure of the subject's maturity. Question C23-24 is a measure of the subject's general military experience. Question C25 is considered to be a measure of the subjects' demonstrated intelligence.

Test Administration

The Cloze tests and attached questionnaire were pre-tested on Army and Air Force personnel assigned to the AROTC and AFROTC units at Iowa State University. The pre-test results disclosed no invalid questions and indicated that the subjects had no difficulty in comprehending the written instructions.

The test implement was administered to thirty-four members of the Headquarters Company 248th Aviation Battalion, Iowa National Guard. The subjects for this test were chosen at random from the company Duty Roster. The demographics for this group are as shown in Table 7.

Table 7. Sample population demographics

	Mean or (Mode) ^a	Range
Age	28	18 to 41
Education	(Attend College)	8th grade to Graduate Student
Rank	(Sergeant)	Private First Class to Captain
Time in Service	6 years	1 year to 20 years

^aThe mode is used in two instances above. The mode is given since in these two cases it presents a more accurate picture of the sample audience.

The subjects were assigned test instruments at random. The instructions were read aloud to the subjects, as they followed the instructions by themselves. The test proctor then completed two examples of Cloze passages for the students via an overhead projector. (Copies of both the instructions and the two examples noted above are in Appendix B.)

RESULTS

The test instrument was analyzed as follows: The Cloze test was scored on an exact word basis (the exact word deleted had to be replaced by the reader to get credit for a correct answer) with allowances made for spelling errors. Illegible answers and answers using the plural of a word used in the text as singular were scored as incorrect. A Cloze test score for each passage on each test was then calculated by dividing the number of correctly filled in blanks by the total number of blanks in each passage. The resulting scores for each passage were then put in arrays, by passage topic, and a two-tailed t-test for significance was run on the means of these arrays.

Data generated by the questionnaire were tallied and analyzed for measures of central tendency, Pearson correlation and regression. The results of the analysis of the Cloze tests and the questionnaire are as reflected in Tables 8 through 11.

Table 8 shows the results of comparisons made between Cloze test score means. The means of original test scores and rewritten test scores over the same topic were compared. It will be noted that in each case the mean of the test score on the rewritten version of a topic was higher than the mean test score on the original version of that topic.

Table 8. Tests for significance between Cloze scores

Topic	Reading Ease Score	Style Difficulty	Version	\bar{X} Cloze Score	Significance
Drug Abuse	36	Difficult	Original	45.42	.07
	64	Standard	Rewrite	56.15	
Motivation	43	Difficult	Original	49.81	0
	73	Fairly Easy	Rewrite	51.79	
Endurance	44	Difficult	Original	45.15	0
	56	Fairly Difficult	Rewrite	50.28	
Leadership Style	52	Fairly Difficult	Original	43.58	.08
	67	Standard	Rewrite	52.31	

It will be noted also that in each case the difference between the means was not significant at the .05 level. In two cases the difference between the means did, however, approach the .05 level or significance.

It appears that writing style difficulty may influence comprehension. It also appears that this influence is not,

however, sufficient to generate significant changes in comprehension. It also appears that comprehension is not tied directly to the Reading Ease scores. The greatest range between Reading Ease scores on the topic of Motivation did not produce a significant difference between means, while a lesser difference between Reading Ease scores on the topics of Drug Abuse and Leadership Style did produce differences between means that approached a significant level.

An evaluation of the mean test score by converting the mean test score to a test score on a multiple-choice type test via the Bormuth conversion table is as shown in Table 9.

Table 9. Cloze score means converted to multiple-choice test scores

Topic	Reading Ease Score	Style	\bar{X} Cloze Test Scores	Percent Correct on Multiple-Choice Test
Drug Abuse	36	Difficult	45.42	80%
	64	Standard	56.15	99%
Motivation	43	Difficult	49.81	87%
	73	Fairly Easy	51.79	90%
Endurance	44	Difficult	45.15	80%
	56	Fairly Difficult	50.28	87%
Leadership Style	52	Fairly Difficult	43.58	73%
	67	Standard	52.31	93%

An analysis of the data in Table 9 indicates that in each case the reader comprehension of the rewritten passages on a topic was greater than the reader comprehension of the original version. However, in three of the four cases the comprehension of the original passages was already quite high (above 75%) and could be said to be higher than expected.

The equivalent multiple-choice scores were derived by converting the mean Cloze test scores. Since this was the case and since it has been shown that there was no significant difference between the means, the difference between the multiple-choice test scores although great was not significant at the .05 level.

Note also that the differences between scores on the same topic does not appear to be tied directly to Reading Ease scores. A difference of thirty Reading Ease points on the topic of Motivation increased the comprehension scores only three percentage points. A difference of only fifteen Reading Ease points on the passages dealing with the topic of Leadership Style raised comprehension scores twenty percentage points.

Table 10 shows the total relationship between reader variables and Cloze scores for each version of each topic.

Table 10. Correlation between reader variables and Cloze scores

Topic	Version	\underline{r}	\underline{r}^2
Drug Abuse	Original	.72	.53
	Rewrite	.76	.58
Motivation	Original	.92	.85
	Rewrite	.77	.59
Endurance	Original	.58	.34
	Rewrite	.85	.73
Leadership Style	Original	.89	.80
	Rewrite	.63	.39

In Table 10 \underline{r} is the correlation coefficient for the reader variables and Cloze test scores. In all cases \underline{r} is positive. This indicates that an increase in the quality reader variables is associated with reader comprehension.

The symbol \underline{r}^2 denotes the percentage of variance in Cloze scores explained by reader variables. The \underline{r}^2 's for the passages on Drug Abuse indicates that fifty-three percent of the variance in the Cloze test scores on the original passage were due to reader variables. Similarly, fifty-eight percent of the variance in the scores on the new version of the passage on Drug Abuse were due to these same reader variables.

However, the above case is the only one in which the input of reader variables as measured by \underline{r} and \underline{r}^2 are roughly equal.

In the other three cases the correlations (\underline{r}) and the correlations squared (\underline{r}^2) on the same topic are not equal.

These correlations do not follow a trend which indicates that the reader must supply more input to comprehend the original (hard) version, than the rewritten (easier) version. In the passages on endurance reader variables accounted for only thirty-four percent of the variance in scores on the original version. Reader variables accounted for seventy-three percent of the variance in scores on the rewritten passage on Endurance.

The following table shows the subjects' opinion as to the difficulty of the texts read.

Table 11. Reader opinion of test difficulty

Reading Ease Score	Topic	Version	Reader Opinion			
			Easiest	Easier	Hard	Hardest
			(%)			
36	Drug Abuse	Original	19	23	19	33
43	Motivation	Original	12	31	18	37
44	Endurance	Original	5	26	36	21
52	Leadership	Original	8	50	16	25
56	Endurance	Revised	21	21	42	14
64	Drug Abuse	Revised	61	23	0	7
67	Leadership	Revised	36	9	18	18
73	Motivation	Revised	26	21	15	15

Table 11 should be read across. Example: Thirty-three percent of those people who read the original version of the passage on Drug Abuse thought that it was the most difficult passage to read of the passages they had read.

Table 11 indicates that the subjects were able to distinguish between difficult and less difficult styles of writing. A majority of the subjects receiving the two most difficult texts identified those texts as the hardest to read.

Similarly, subjects also rated the new version of texts written in a less difficult style as easier to read than the original passages. However, the rewritten passage on Drug Abuse was selected by the subjects as the easiest to read, when, in fact, the easiest to read by Reading Ease score was the rewritten passage on Motivation.

The overall trend reflected in this table is that the subjects could distinguish between easy and difficult texts and that the subjects' opinion of the ease or difficulty of these texts corresponded roughly to the Reading Ease ratings of the texts. Overall, passages rated by formula as written in a difficult style were rated as difficult to read by the subjects. Conversely, texts written in a less difficult style were rated by the subjects as easier to read.


In the survey questionnaire readers were also asked to give their opinion as to how difficult in general they thought Army Field Manuals were to read. Seventeen percent of the subjects had no opinion, twelve percent thought Field Manuals

were very hard to read, thirty percent of the subjects thought that Field Manuals were hard to read, another thirty percent thought the reading level was about right, and only three percent thought that Field Manuals were easy to read.

This opinion scale roughly parallels the education levels of the sample populace. Roughly forty-two percent of the sample populace claimed that Army Field Manuals were very hard or hard to read. Roughly forty-four percent of the sample had a trade school, high school, or less education and as such, they should, according to readability formula indices, find materials written at an academic or scholarly level (Reading Ease, thirty to fifty) hard or very hard to read. Similarly fifty-six percent of the sample population had either a complete or partial college education and as such should find this same material about right or easy to read.

It should, however, be noted that this parallel is based on broad limits of education and does not take into account other reader variables. Moreover, it should also be noted that reader opinion of text difficulty does not parallel reader comprehension scores. The most significant finding of both this analysis and of Table 11 is that reader opinion appears to rank articles in roughly the same order as does the Flesch formula.

CONCLUSIONS

Results of a two-tailed t-test disclosed that none of the differences between the means of scores on two versions of the same passage were significant at the .05 level. This in turn, indicates that the null hypothesis offered earlier is valid. There is, however, other evidence which although not strong enough to refute the hypothesis does suggest that writing style difficulty may under some conditions influence comprehension. Nonetheless the primary tool of analysis used in this project was the t-test for significance, since these tests did not disclose any significant differences the hypothesis that changes in the writing style difficulty as measured by a readability formula will not influence reader comprehension as measured by Cloze procedure is assumed to be valid. 

Tendencies and Discussion

While none of the t-tests discussed above did in fact reveal significant differences between means at the .05 level, two of these tests did show the differences between means as approaching this level. The difference between the means on the topic of Drug Abuse was significant at the .07 level, and the difference between the means on the topic of Leadership Style was significant at the .08 level. Regression analysis of the influence of reader variables on these scores

reveals that the amount of variance in scores accounted for by reader variables on the topic of drugs was almost identical for both versions, ($r^2 = .53, .58$) while the mean scores approached a significant (.05) difference; with the mean for the easier article being higher than that of the more difficult article. This then would indicate that writing style difficulty does influence reader comprehension. Support for this interpretation is found in the comparison of the passages on Leadership Style. Once again the article with the less difficult style of writing produced higher mean score (at the .08 level) than the article with the more difficult style of writing. In this article regression analysis showed that the amount of variance accounted for by reader variables in the passage written in a more difficult style was much larger ($r^2 = .80$) than the amount of variance accounted for in the scores of the article written in a less difficult style ($r^2 = .39$). Had these tendencies occurred in every comparison there would have been grounds for inferring that the null hypothesis was invalid. However, these tendencies did not appear in each of the comparisons between passages on the same topic.

Moreover these two tendencies do not seem to be directly tied to the differences in the Reading Ease scores of the articles. The Reading Ease score difference between old and new versions of the texts on Drug Abuse and Leadership Style are 28 and 15 respectively. It is assumed that if the tendencies reported were in fact tied directly to the difference in

Reading Ease scores (measures of writing style difficulty) then these tendencies should have occurred where the difference between Reading Ease scores was the largest. This was not the case. The difference in Reading Ease Scores in the two passages on Motivation was thirty points, yet there was no significant difference between the means.

Additional support for the statement that the comprehension scores do not seem to be directly tied to the style of writing difficulty as rated by formula, can be seen by comparing the range of style difficulty ratings to the range of comprehension scores. The range of ratings of style difficulty ran from difficult or college level (Reading Ease scores of 36, 43, 44) through fairly difficult or high school level (Reading Ease scores of 52 and 56) and standard or eighth to ninth grade level (Reading Ease scores of 64 and 67) to fairly easy or seventh grade level (Reading Ease score 73) and yet the comprehension scores clustered around the forty to fifty percent level with the lowest mean at forty-three and the highest at fifty-six. If the Cloze test mean scores are converted to equivalent percent correct on multiple-choice comprehension test scores by use of the Bormuth conversion table the range does become greater, but does not parallel the range of Reading Ease scores. The range limits for converted test scores are a low of seventy-three percent on a passage with a Reading Ease score of fifty-two (fairly difficult style) to a high of ninety-nine on a passage with a

Reading Ease score of sixty-four (standard difficulty). The converted test scores for the two passages which form the range limits on Reading Ease Scores are eighty percent on a passage rated difficult (Reading Ease score 36) to ninety percent on a passage rated fairly easy (Reading Ease score 73).

Inspection of the Bormuth Conversion Table also reveals that in every case but one the subjects would have achieved at least eighty percent on a multiple-choice type test. This in turn indicates that the subjects comprehended even the most difficult passages and that their comprehension of the easier passages was only slightly (but not significantly as shown by the t-tests) greater on the easier passages.

Most of the data generated by the Cloze tests and the questionnaire has been reported. The Cloze tests have been reported on as such and the questions used to measure reader variables have been reported on through the discussion of regression coefficients used in discussing the tendencies noted earlier. The data gathered on reader opinion of the texts read and Army Field Manuals has not been discussed. These opinions do not bear directly on the conclusions of this project, but, these opinions do reveal some interesting tendencies.

The subjects tended to rank the passages in the same order as did the Flesch Reading Ease Formula. While this was not true in all cases, it was an overall trend. This trend was reflected in that a majority of people who read the

original passage on Drug Abuse rated it as the hardest passage to read. According to the Reading Ease score for that passage it was the hardest to read. A majority of the subjects reading the rewritten version of the passage on Motivation identified it as the easiest passage to read of the ones they had read. It should, however, be noted that this analysis and the trend reported tends to decline as the Reading Ease scores move from either end toward the middle of the array. One reason for this is, obviously, that as the difference between the Reading Ease scores tend to be less distinct from each other there is less difference for the reader to make his judgments on. The second reason for the decline is that these opinions are relevant to the test passages read by a subject and not the test passages overall.

The subjects identifying the passage with a Reading Ease score of thirty-six as the most difficult passage can be said to be correct since there was no other passage with a lower Reading Ease score. Subjects rating the original passage on Motivation (Reading Ease score - forty-three) may have correctly rated that passage as the hardest to read providing that they did not also read the passage with a Reading Ease score of thirty-six. Since it is impossible to tell what passages were judged as hardest, or easiest, in comparison to others, any conclusions made on these subject opinions must be viewed with some skepticism.

The subject's opinion of level of reading difficulty when compared to the subject group education profile reveals an interesting but not exact parallel. It appears that the subject's opinion of the level of reading difficulty may be tied to the subject's education level. These two items achieved a slight Pearson correlation ($r = .23$) but this may have been to the way the data were arranged and the large number of missing values in the opinion scale.

Critique

A critique of this thesis is presented here not to refute or substantiate the results gathered or the conclusions presented. The critique is simply an observation of the research project as an entity. This observation is made to present the project in the perspective of what was done as opposed to what could have been done, or should be done, if the project were to be replicated.

The number of passages used in this experiment coupled with the number of subjects used created cell sizes for each passage of less than the optimum size. These small cell sizes may have been responsible for the tendencies observed in comparing mean scores appearing only as tendencies rather than significant differences. Future studies similar to this should use fewer passages or more subjects (if available) or both, in an attempt to create large cells from which more valid comparisons can be made.

With respect to the measurement of reader variables it should be noted that the survey questionnaire is believed to have been an effective measurement tool. It could have been more effective had there been a way for this tool to create interval variables from all the data measured. While this tool did create interval variables with respect to the measurement of reading skill, age, and respondents time in military service, it did not create true interval variables in the case of education, motivation, experience and maturity. Perhaps these categories are not prone to fit an interval-type measurement scale.

If nothing else is gained by presenting this questionnaire it can at least serve as a starting point for future studies in that the measurement scales created by this questionnaire can possibly be refined to measure more precisely the reader variables influencing comprehension.

A last point to be noted is that the education level of the subjects tested tended to be higher than it possibly should have been considering the material used in the test. The subjects, however, were drawn at random and since that was the case there was obviously no attempt to bias the results. Nonetheless a random sample containing a larger and less educated group of subjects might have altered the results and conclusions of this project.

Future Research

Future research on the topic of readability, the influence of writing style difficulty on reader comprehension, should be geared toward examining the possibility of a curvilinear relationship between writing style difficulty and reader comprehension. It may well be that writing style difficulty does influence comprehension at some point based on the reader variables of education, experience, maturity, motivation, age and reading skill.

This possibility was examined in this research project, but it did not appear. This lack of appearance could be due to the small cell size for each passage in this experiment, or it could be due to the relatively high education level of the subjects, or it could be due to the fact that a curvilinear relationship does not exist, but it should be, at a future date, examined.

Another facet of readability research that needs more exploration and explanation is the influence of each of the reader variables. Data on these variables is scant. The review of literature involved in this paper convinced the author that although readability experts freely admit to the existence of these variables, they make no attempt to investigate their influence. Also, they make little or no attempt to hold these variables constant when conducting research experiments. The failure to account for all the variables may well distort the results and conclusions of

research experiments and, in addition, may cause the field of readability to be regarded with some skepticism.

In summary, future research in the field of readability is needed, particularly along the lines noted above. Future research could possibly not only help to explicate the confusing and contradictory findings of past research but also explain the trends and tendencies noted in this project.

BIBLIOGRAPHY

- Belden, B. R. 1962. Utilization of Readability Formulas for Effective Instruction. Eleventh Yearbook of the National Reading Conference 11:139-147.
- Bickley, A. D., B. J. Ellington, and R. T. Bickley. 1970. The Cloze Procedure: A Conspectus. Journal of Reading Behavior 2:232-249.
- Bormuth, John Robert. 1962. Cloze Tests as Measures of Readability and Comprehension Ability. Ph.D. Thesis. Indiana University (Libr. Congr. Card No. Mic. 63-02586). 205 pp. University Microfilms, Ann Arbor, Mich. (Diss. Abstr. 23, No. 11:4218).
- Bormuth, J. R. 1965. Optimum Sample Size and Cloze Test Length in Readability Measurement. Journal of Educational Measurement 28:111-116.
- Bormuth, J. R. 1966. Readability: A New Approach. Reading Research Quarterly 1:18-31.
- Bormuth, J. R. 1967. New Data on Readability. Proceedings of the International Reading Association. American Educational Research Association, Seattle, Wash.
- Bormuth, J. R. 1968. Cloze Test Readability Criterion Reference Scores. Journal of Education Measurement 5:189-196.
- Brayfield, A. H., and P. A. Reed. 1950. How Readable are Occupational Information Booklets? Journal of Applied Psychology 34:325-328.
- Brinton, J. E., and W. A. Danielson. 1958. A Factor Analysis of Language Elements Affecting Readability. Journalism Quarterly 35:420-426.
- Brown, J. I. 1952. The Flesch Formula: Through the Looking Glass. College English 13:393-394.
- Bussey, C. D. 1970. Readability Levels of Army Regulations. Master Thesis. Indiana University. Journalism Abstracts 8:49. (Abstr.)
- Carlucci, C., and W. J. E. Crissy. 1951. How Readable are Employee Handbooks? Personnel Psychology 4:383-395.

- Chall, J. S. 1955. Measurements of Readability. *Education Digest* 21:44-46.
- Coleman, E. B. 1962. Improving Comprehensibility by Shortening Sentences. *Journal of Applied Psychology* 46:131-134.
- Coleman, E. B., and G. R. A. Miller. 1968. A Measure of Information Gain During Prose Learning. *Reading Research Quarterly* 3:369-386.
- Dale, E. J., and J. S. Chall. 1949. The Concept of Readability. *Elementary English* 26:19-25.
- Davis, K., and J. O. Hopkins. 1950. Readability of Employee Handbooks. *Personnel Psychology* 3:317-326.
- Dickens, M., and F. Williams. 1964. An Experimental Application of Cloze Procedure and Attitude Measures to Listening Comprehension. *Speech Monographs* 31:103-108.
- Dolch, E. W. 1949. The Use of Vocabulary Lists in Predicting Readability and Developing Reading Materials. *Elementary English* 26:142-149, 177.
- Flesch, Rudolph F. 1944. The Marks of Readable Style. *Teachers College Record* 45:422-423. (Abstr.)
- Flesch, R. F. 1949. *The Art of Readable Writing*. Collier-McMillan, New York, New York. 255 pp.
- Flesch, R. F. 1951. *How to Test Readability*. Harper Brothers, New York, New York. 56 pp.
- Greene, Frank Pierrepont. 1964. A Modified Cloze Procedure for Assessing Adult Reading Comprehension. Ph.D. Thesis. The University of Michigan (Libr. Congr. Card No. Mic. 65-05308). 130 pp. University Microfilms, Ann Arbor, Mich. (Diss. Abstr. 25, No. 10:5734).
- Greene, F. P. 1965. Modification of the Cloze Procedure and Changes in Reading Test Performances. *Journal of Educational Measurement* 2:213-217.
- Greene, F. P., A. G. Cranney, J. R. Bormuth, R. Bloomer, E. Rankin, W. Weaver, and E. Brown. 1968. A Cloze Symposium. *Seventeenth Yearbook of the National Reading Conference* 17:110-131.
- Hafner, L. E. 1964. Relationships of Various Measures to the Cloze. *Thirteenth Yearbook of the National Reading Conference* 13:135-145.

- Hafner, L. E. 1965. Implications of Cloze. Fourteenth Yearbook of the National Reading Conference 14:151-158.
- Hafner, L. E. 1966. Cloze Procedure. Journal of Reading 9:415-421.
- Hayes, P. M., J. J. Jenkins, and B. J. Bradley. 1950. Reliability of the Flesch Readability Formulas. Journal of Applied Psychology 34:22-26.
- Hildreth, G., and G. Wagner. 1954. Putting the Know-How of Readability to Work. Midland Schools 68:16-17,42.
- Hites, Robert. 1950. The Relationship of Readability and Format to Retention in Communication. Ph.D. Thesis. Ohio State University. 137 pp.
- Hotchkiss, S. N., and D. G. Patterson. 1950. Flesch Readability Reading List. Personnel Psychology 3:327-344.
- Hvistendahl, J. K. 1957. Use of Cloze Procedure to Obtain Live Statistics. Journalism Quarterly 34:255.
- Hvistendahl, J. K. 1958. Language Ability as a Factor of Cloze Scores. Journalism Quarterly 35:353-354.
- Jefferson, George Lee, Jr. 1969. Lexical and Structural Items as Predictors of Readability for High and Low Ability Readers. Ph.D. Thesis. University of Georgia (Libr. Congr. Card No. Mic. 70-10200). 152 pp. University Microfilms, Ann Arbor, Mich. (Diss. Abstr. 30, No. 12:05287-A).
- Kearl, B. E. 1948. A Closer Look at Readability Formulas. Journalism Quarterly 25:344-348.
- Kearl, B. E., and R. D. Powers. 1958. Further Directions for Readability Research. Journalism Quarterly 35:427-432.
- Klare, G. R. 1952. Measures of the Readability of Written Communication: An Evaluation. Journal of Educational Psychology 43:385-399.
- Klare, G. R. 1963. The Measurement of Readability. The Iowa State University Press, Ames, Iowa. 328 pp.
- Knight, David W. 1966. The Reading Performance of Students with Ninth Grade Reading Achievement on Occupational Information Materials Written with Various Levels of Readability. Ph.D. Thesis. The Florida State University (Libr. Congr. Card No. Mic. 67-00297). 71 pp. University Microfilms, Ann Arbor, Mich. (Diss. Abstr. 27, No. 10:2425A).

- Lorge, Irving. 1944. Predicting Readability. Teachers College Record 45:404-419.
- Lorge, I. 1949. Readability Formulae: An Evaluation. Elementary English 26:86-98.
- Marshall, J. S. 1956. The Relationship Between Readability and Comprehension. Ph.D. Thesis. Syracuse University. 119 pp.
- Miller, L. R. 1975. Predictive Powers of the Flesch and Bormuth Readability Formulas. Journalism Quarterly 51:508-511.
- Potter, T. C. 1968. A Taxonomy of Cloze Research. Report to U. S. Office of Education (DHEW). Southwest Regional Laboratory for Educational Research and Development, Inglewood, Calif.
- Rankin, Earl Fredrick, Jr. 1958. An Evaluation of the Cloze Procedure as a Technique for Measuring Reading Comprehension. Ph.D. Thesis. University of Michigan (Libr. Congr. Card No. Mic. 58-3722). 234 pp. University Microfilms, Ann Arbor, Mich. (Diss. Abstr. 19, No. 04:733).
- Rankin, E. F., Jr. 1959. The Cloze Procedure: Its Validity and Utility. Eighth Yearbook of the National Reading Conference 8:131-144.
- Rankin, E. F., Jr. 1965. The Cloze Procedure: A Survey of the Research. Fourteenth Yearbook of the National Reading Conference 14:133-150.
- Rankin, E. F., Jr., and J. W. Culhane. 1969. Comparable Cloze and Multiple Choice Comprehension Test Scores. Journal of Reading 13:193-198.
- Robinson, F. P. 1947. The effects of Language Style on Reading Performance. Journal of Educational Psychology 38:149-156.
- Standlee, L. S., and N. A. Fattu. 1956. The Readability of Navy Publications. Journal of Educational Research 49:471-473.
- Sticht, T. S., J. S. Gaylor, R. P. Kern, and L. C. Fox. 1971. Determinations of Skill Requirements in Four Military Occupational Specialties. Human Resources Research Organization Technical Report 71-23. Human Resources Research Organization, Alexandria, Va.

- Taylor, W. L. 1953. Cloze Procedure: A New Tool for Measuring Readability. *Journalism Quarterly* 30:415-433.
- Taylor, W. L. 1956. Recent Developments in the Use of Cloze Procedure. *Journalism Quarterly* 33:42-48,99.
- Taylor, W. L. 1957. Cloze Readability Scores as Indices of Individual Differences in Comprehension and Aptitude. *Journal of Applied Psychology* 45:19-27.
- VanRooy, L. 1973. Readability Studies and the Writer of Instructional Materials. Report to Career Development for Children Project. Southern Illinois University, Carbondale, Ill.
- Weaver, W. W. 1965. Theoretical Aspects of the Cloze Procedure. *Fourteenth Yearbook of the National Reading Conference* 14:115-131.
- Weaver, W. W., and A. J. Kingston. 1963. A Factor Analysis of the Cloze Procedure and Other Measures of Reading and Language Ability. *Speech Monography* 13:252-261.
- Weaver, W. W., and A. J. Kingston. 1967. Recent Developments in Readability Appraisal. *Journal of Reading* 11:44-47.

ACKNOWLEDGEMENTS

The guidance and advice given by Dr. J. K. Hvistendahl, my major professor, is gratefully appreciated.

A sincere thank you to the other members of my committee.

The assistance and help of Dr. J. Paul Yarbrough is also sincerely appreciated.

The assistance of the Iowa State University AROTC faculty and Headquarters Company 248th Iowa National Guard is appreciated.

Finally, a sincere thank you to my wife and daughter for their patience and understanding.

APPENDIX A: ORIGINAL AND REWRITTEN PASSAGES

Original Passage on Drug Abuse
Reading Ease Score 36

It is often said that we are a "drug-oriented society". Drugs of all kinds are readily available by prescription or over-the-counter purchase to anyone who wants them. And, at one time or another, everyone is a drug user, whether the drug be caffeine, alcohol, nicotine, aspirin, or one of the illegal drugs such as LSD or heroin. The use of the drugs listed above, as well as many other stimulants, depressants, and euphorics (such as marijuana) is not new. However, the use of illicit drugs and the excessive use of alcohol has become more prevalent in our society during the last several years and is a problem which concerns leaders. Leaders must recognize the drug abuse problem, and understand that drug usage itself is generally not the underlying problem. It is a symptom of the emotional or physical problems of the user or a reflection of the users environment. However, it is a fact that drug abuse is a problem among our soldiers and today's leaders are faced with the challenge of dealing with drug-related problems.

In the past, it was customary for social scientists to "type" drug abusers into groups which seemed to best fit their ethnic or economic backgrounds. Heroin and marijuana were used by the underprivileged and by criminals. Alcohol was abused by the residents of "Skidrow" and eccentrics, while the stimulants and depressants were generally abused by the middleclass adult under the guise of medical need. While this stereotyping still exists, it is more incorrect now than before.

Rewritten Passage on Drug Abuse
Reading Ease Score 64

It has been said that we are a "drug-oriented society". Most drugs are easy to get, either by prescription or over-the-counter purchase. People who want drugs can get them with no problem at all. Everyone is a drug user at one time or another. Caffeine, alcohol, nicotine, and aspirin are drugs many people use. Other people use illegal drugs like heroin or LSD. The use of drugs is definitely not new. The use of the above drugs or of other stimulants, depressants, and euphorics (like marijuana) has been going on for a long time. But, the use of illegal drugs and the excessive use of alcohol has been on the rise in the last few years.

Both drug and alcohol abuse are problems which concern our leaders. Leaders must face up to the drug problem. They must realize that drug and alcohol abuse are only the symptoms of deeper problems. Drug users often have emotional or physical problems. Sometimes the problem reflects the users environment. These types of problems drive people to drug abuse.

The fact is, drug abuse is a problem among today's soldiers. Today's leaders are faced with the challenge of dealing with drug-related problems.

Social scientists used to "type" drug abusers into groups based on the user's ethnic or economic background. The poor and criminals used heroin and marijuana. "Skidrow" residents and eccentrics used alcohol. Middle-class adults used stimulants

and depressants under the guise of medical need. This stereotyping still exists, and it is more incorrect than ever.

Original Passage on Motivation
Reading Ease Score 43

The task of motivating subordinates is squarely on the leader's shoulders. His first task in motivating his men is to recognize the existence of both the formal and informal contract between the soldier and the Army and to insure that the terms of these contracts are met. The formal contract is the military obligation a man incurs when he is sworn into military service. The informal contract consists of those implied obligations and responsibilities which the organization and the soldier have to each other. The informal contract is based on individual and organizational expectations and on the necessity for each to satisfy the other. The leader plays an important role as the organization's representative in insuring that the terms of the informal contract are fulfilled by both parties.

Units have standards in such things as job proficiency, discipline, participation as a team member, and personal conduct - to name a few. In the same way, the soldier has certain expectations which must be met by his unit. The unit must reasonably satisfy his "physical" needs for food, water, shelter, etc. It must also provide a climate for the satisfaction of his "learned" needs for security, law, and order; his "belonging" needs of family, work, and social groups; and his "self-satisfaction" need for self-fulfillment. By directly satisfying the soldier's physical needs and giving him the opportunity to

satisfy his learned needs, the unit meets the basic terms of the informal contract it has with the soldier. The opportunity is now present to motivate him to accomplish the organizational goals.

Rewritten Passage on Motivation
Reading Ease Score 73

Your job is to motivate your troops. The first thing you should realize is that there are two contracts between the soldier and the Army. One contract is a formal one. The other contract is informal. You must see that the terms of both contracts are met. The formal contract is the military obligation a man incurs when he is sworn into the Army. The informal contract is based on what both the soldier and the Army expect, and the need for each to satisfy the other. You play an important role in these contracts. You must make sure that the terms of both contracts are met by both parties.

The Army expects a soldier to meet certain standards. A soldier must be good at his job; obey Army rules; work as a part of a team; live up to standards of personal conduct; etc. The soldier also has certain expectations. He wants the Army to meet his physical needs (food, water, shelter, etc.). He wants the Army to satisfy his "learned" needs (the need for security, law, and order). He wants the Army to satisfy his "belonging" needs of family, work, and social groups. He wants his self-satisfaction needs (the need for self-fulfillment) met. The Army meets the basic terms of the informal contract in two ways: First, it directly satisfies his physical needs. Second, it gives him the chance to satisfy his learned needs. When both needs are met, you can then motivate your men to accomplish unit goals.

Original Passage on Endurance
Reading Ease Score 44

Endurance, the mental and physical stamina measured by the ability to withstand pain, fatigue, stress, and hardship, is akin to courage. It is an important quality of leadership which leaders must have if they are to merit the proper respect from subordinates. Subordinates may view a lack of endurance in a combat situation as cowardice. Likewise, the leader's lack of endurance makes him a liability rather than the asset that he should be. The leader sets the standards for a unit most effectively by example. The leader must display an acceptable, if not superior, level of endurance. He may develop his endurance and stamina by regular participation in strenuous physical and mental activities. Frequent self-administered tests can give the leader a measure of his endurance level. Self-discipline and fortitude are essential in developing and maintaining endurance.

Enthusiasm is the display of sincere interest and zeal in the performance of duties. This requires the leader to be optimistic and cheerful. The leader must, therefore, willingly accept the challenges of his profession and determine to do the best job possible. This attitude, when developed, helps create a good unit. Whether in training or combat, enthusiastic troops are very helpful in accomplishing the mission. A most important step in instilling enthusiasm in men is explaining the "why" of the leader's actions. If soldiers believe in,

and understand, a mission they usually do their best to accomplish it. To avoid becoming stale, set aside a brief period daily to relax. Capitalize on success. Enthusiasm is contagious and nothing will develop it more than the success of a unit or an individual.

Rewritten Passage on Endurance
Reading Ease Score 56

Endurance is mental and physical stamina. It is measured by how you stand-up under pain, fatigue, stress, and hardship. Endurance is akin to courage. Endurance is an important part of leadership. You must have endurance if you hope to earn the respect of your men. In combat your lack of endurance may be seen as cowardice. And, without endurance you are a liability, not an asset to your unit. Your unit's standards are set by your actions. You must have a high level of endurance if you expect the same from your men. Develop yourself physically and mentally. Frequent strenuous physical and mental activity will build your endurance and stamina. You should test yourself often to measure your endurance. Self-discipline and fortitude are needed to develop and maintain endurance.

Enthusiasm is showing interest and zeal in your job. An enthusiastic leader must be optimistic and cheerful. You should look for and accept the challenges of your job. Be determined to do your best. Enthusiasm helps to create a good unit. Enthusiastic troops are the key to accomplishing training and combat missions. Explaining the "Why" of your actions to your men is an important step in creating enthusiasm. Your men will do a better job when they believe in, and understand their missions. Avoid becoming stale. A stale leader is an unenthusiastic leader. Take time each day to relax.

Relaxing will keep you from becoming stale. Capitalize on success. Enthusiasm is contagious. Nothing will build enthusiasm more than individual or unit success.

Original Passage on Leadership Style
Reading Ease Score 52

Styles of leadership vary depending on the leader's personality, his men, and the situation. Style has long been a topic of discussion and consideration among men and their leaders alike. Although it is an interesting topic for discussion, in the final analysis, the proper style for any leader is that which helps him lead best.

Leaders are not restricted to any one stereotyped style of leadership. In fact, one man may, depending on the situation, use an authoritarian style in one instance and a democratic style in another.

A completely authoritarian leader reserves control for himself. A democratic leader involves his men in making a decision, but reserves the decision for himself.

The leader can choose the style of leadership which will best assist him in mission accomplishment. Before the selection is made, however, he must realize that he is responsible for everything his unit does or fails to do. He should, therefore, be prepared to adjust his style depending on the results he gets. His style is influenced by the many facets of his personality, value system, confidence in subordinates, knowledge, and leadership inclinations.

His value system will influence his style selection because if he feels that a leader should make all decisions, then he will. If he feels that subordinates should share in making

decisions, he will tend to select a style that supports this value. The degree of confidence in his men will also influence his style. If he has no confidence in his men then the leader will probably not involve them in decisions.

Rewritten Passage on Leadership Style
Reading Ease Score 67

Leadership styles vary. The style used depends on the situation, the leader and his men. Men and their leaders often talk about leadership style. It is an interesting topic to discuss. But, the right style for a leader is that which helps him lead best.

There is no one best style of leadership. Leaders are not limited to only one style of leadership. A man may use both authoritarian and democratic styles of leadership. The style used depends on the situation.

Authoritarian leaders reserve control for themselves. Democratic leaders involve their men in decision making, but make the decisions themselves.

The leader picks the leadership style that gets the best results. The best result is to accomplish the mission. Before he picks a style the leader should know that he is responsible for everything his unit does or fails to do. He must be ready to change his style to get the best results. Style depends on several things. It depends on the leader's personality, value system, and knowledge. It also depends on how much confidence he has in his men. Finally style also depends on the leader's own beliefs as to what a leader should do.

A leader's value system will influence the style he uses. If he feels that he should make all the decisions, he will. If

he feels that his men should share in making decisions he will pick a style that allows them to. The degree of confidence in his men will also affect his style. A leader who has no faith in his men usually will not involve them in decisions.

APPENDIX B: INSTRUCTIONS AND EXAMPLES

Instructions for Cloze Test

The tests you are about to take are tests of reading comprehension; or understandability. There are four tests, one test on each page (pages 1 thru 4).

The tests are fill in the blank tests. To take the test, begin reading the text; when you come to a blank, write in the word that you think belongs in the blank. For example, in the sentence, "Last week a tornado_____ in Jordan," the answer should be touched-down. Thus, the sentence would read, "Last week a tornado touched-down in Jordan." In some cases any one of several words could correctly fill in the blank; in these cases, put in the word that comes to mind first.

You will notice that all the blanks are the same length. The length of the blank does not equal the length of the word. Some of the missing words are very short words like: a, an, the, that, ours, yours, etc. Some of the missing words are long words like: problems, tactical, leadership, orientation, etc. In all cases, there is only one word to a blank (although some blanks may be filled in by using contractions or hyphenated words like can't and it's or man-eating and drug-related). In every case a blank does represent a missing word.

Your score on this test has absolutely no bearing on your job with the Guard. Your answers on these tests and on the questionnaire will not be shown to anyone. All answers on

both the questionnaire and test will be held in confidence, and the test booklets will be destroyed after the answers have been tabulated for statistical tests.

1. Please fill in as many blanks as you can on each test.
2. Do not be afraid to guess at the answers. Wrong answers do not count against you.
3. Spelling errors are not counted against you.
4. Please write or print your answers as neatly as possible.
5. Take as much time as you need to complete the tests and the questionnaire.
6. When you complete one test, go on to the next; when you complete the last test, go on to the questionnaire.

One last point: It is tempting on a test like this to put in words that change the meaning of the text. Putting in words that give the test a funny or "off-color" (or both) meaning is pointless, neither you nor I will gain anything from it.

What is being done here today is done in the name of research. This research may, at some later date, help you by providing you with FM's, TM's and regulations that are easier to read and understand.

If you have any questions while you are taking the tests or completing the questionnaire, please ask me for an answer.

Example 1
CLOZE TEST EXAMPLE WORKED FOR SUBJECTS

A VALUE MAY BE _____ AS AN ATTITUDE FOR _____
AGAINST AN EVENT BASED _____ THE BELIEF THAT IT
_____ OR HARMS SOME PERSON, _____, OR
INSTITUTION. USING THIS _____, A VALUE IS A
_____ OUTWARD DISPLAY OF BEHAVIOR _____, AS
SUCH, IS OBSERVABLE _____ MEASURABLE.

A VALUE MAY BE DEFINED _____ AS AN ATTITUDE FOR _____ OR
AGAINST AN EVENT BASED _____ ON _____ THE BELIEF THAT IT
_____ HELPS _____ OR HARMS SOME PERSON, _____ GROUP _____, OR
INSTITUTION. USING THIS DEFINITION _____, A VALUE IS A
RECOGNIZABLE _____ OUTWARD DISPLAY OF BEHAVIOR _____ AND _____, AS
SUCH, IS OBSERVABLE _____ AND _____ MEASURABLE.

Example 2
CLOZE TEST EXAMPLE WORKED FOR SUBJECTS

LEADERS SPEND MUCH TIME _____ THE STUDY OF THE
 _____ ASPECTS OF THEIR JOBS-- _____ HOW
 THEIR EQUIPMENT WORKS, _____ IS REQUIRED TO PREVENT
 _____ FROM MALFUNCTIONING, AND HOW _____
 CAN BE REPAIRED. FOR _____ MOST PART, HOWEVER, THEY
 _____ OR STUDY LITTLE ABOUT _____ MAKES
 THEIR MEN TICK-- _____ OR IN GROUPS.

LEADERS SPEND MUCH TIME _____ ON _____ THE STUDY OF THE
 _____ TECHNICAL _____ ASPECTS OF THEIR JOBS-- _____ LEARNING _____ HOW
 THEIR EQUIPMENT WORKS, _____ WHAT _____ IS REQUIRED TO PREVENT
 IT _____ FROM MALFUNCTIONING, AND HOW _____ IT _____
 CAN BE REPAIRED. FOR _____ THE _____ MOST PART, HOWEVER, THEY
 KNOW _____ OR STUDY LITTLE ABOUT _____ WHAT _____ MAKES
 THEIR MEN TICK-- _____ INDIVIDUALLY _____ OR IN GROUPS.

APPENDIX C: CLOZE TESTS

Cloze Test on Original
Passage on Drug Abuse

It is often said _____ we are a "drug-oriented _____". Drugs of all kinds _____ readily available by prescription _____ over-the-counter purchase to anyone _____ wants them. And, at _____ time or another, everyone _____ a drug user, whether _____ drug be caffeine, alcohol, _____, aspirin, or one of _____ illegal drugs such as _____ or heroin. The use _____ the drugs listed above, _____ well as many other _____, depressants, and euphorics (such _____ marijuana) is not new. _____, the use of illicit _____ and the excessive use _____ alcohol has become more _____ in our society during _____ last several years and _____ a problem which concerns _____. Leaders must recognize the _____ abuse problem, and understand _____ drug usage itself is- _____ not the underlying problem. _____ is a symptom of _____ emotional or physical problems _____ the user or a _____ of the users environment. _____, it is a fact _____ drug abuse is a _____ among our soldiers and _____ leaders are faced with _____ challenge of dealing with _____ related problems.

In the _____, it was customary for _____ scientists to "type" drug _____ into groups which seemed _____ best fit their ethnic _____ economic backgrounds. Heroin and _____ were used by the _____ and by criminals. Alcohol _____ abused by the residents _____ "Skidrow" and eccentrics, while _____ stimulants and depressants were _____ abused by the middleclass _____ under the guise of _____ need. While this stereotyping _____ exists, it is more _____ now than before.

Cloze Test on Rewritten
Passage on Drug Abuse

It has been said _____ we are a "drug-oriented _____". Most drugs are easy _____ get, either by prescription _____ over-the-counter purchase. People who _____ drugs can get them _____ no problem at all. _____ is a drug user _____ one time or another. _____, alcohol, nicotine, and aspirin _____ drugs many people use. _____ people use illegal drugs _____ heroin or LSD. The _____ of drugs is definitely _____ new. The use of _____ above drugs or of _____ stimulants, depressants, and euphorics (_____ marijuana) has been going _____ for a long time. _____, the use of illegal _____ and the excessive use _____ alcohol has been on _____ rise in the last _____ years.

Both drug and _____ abuse are problems which _____ our leaders. Leaders must _____ up to the drug _____. They must realize that _____ and alcohol abuse are _____ the symptoms of deeper _____. Drug users often have _____ or physical problems. Sometimes _____ problem reflects the user's _____. These types of problems _____ people to drug abuse.

_____ fact is, drug abuse _____ a
problem among today's _____. Today's leaders are
faced _____ the challenge of dealing _____
drug-related problems.

Social scientists _____ to "type" drug abusers
_____ groups based on the _____ ethnic or
economic background. _____ poor and criminals used
_____ and marijuana. "Skidrow" residents
_____ eccentrics used alcohol. Middle-class
_____ used stimulants and depressants _____
the guise of medical _____. This stereotyping still
exists, _____ it is more incorrect _____
ever.

Cloze Test on Original
Passage on Motivation

The task of motivating _____ is squarely on the _____ shoulders. His first task _____ motivating his men is _____ recognize the existence of _____ the formal and informal _____ between the soldier and _____ Army and to insure _____ the terms of these _____ are met. The formal _____ is the military obligation _____ man incurs when he _____ sworn into military service. _____ informal contract consists of _____ implied obligations and responsibilities _____ the organization and the _____ have to each other. _____ leader plays an important _____ as the organization's representative _____ insuring that the terms _____ the informal contract are _____ by both parties.

Units _____ standards in such things _____ job proficiency, discipline, participation _____ a team member, and _____ conduct - to name a _____. In the same way, _____ soldier has certain expectations _____ must be met by _____ unit. The unit must _____ satisfy his "physical" needs _____ food, water, shelter, etc. _____ must also provide a _____ for the satisfaction of _____ "learned" needs for security, _____.

and order; his "belonging"_____of family, work, and
_____groups; and his "self-satisfaction"_____
for self-fulfillment. By directly_____the soldier's
physical needs_____giving him the opportunity
_____satisfy his learned needs, _____unit
meets the basic_____of the informal contract
_____has with the soldier. _____
opportunity is now present_____motivate him to
accomplish_____organizational goals.

Cloze Test on Rewritten
Passage on Motivation

Your job is to _____ your troops. The first _____ you should realize is _____ there are two contracts _____ the soldier and the _____. One contract is a _____ one. The other contract _____ informal. You must see _____ the terms of both _____ are met. The formal _____ is the military obligation _____ man incurs when he _____ sworn into the Army. _____ informal contract is based _____ what both the soldier _____ the Army expect, and _____ need for each to _____ the other. You play _____ important role in these _____. You must make sure _____ the terms of both _____ are met by both _____.

The Army expects a _____ to meet certain standards. _____ soldier must be good _____ his job; obey Army _____; work as a part _____ a team; live up _____ standards of personal conduct; _____. The soldier also has _____ expectations. He wants the _____ to meet his physical _____ (food, water, shelter, etc.). _____ wants the Army to _____ his "learned" needs (the _____ for security, law, and _____). He wants the Army _____ satisfy his "belonging" needs

_____ family, work, and school _____. He
wants his self-satisfaction _____ (the need for self-
fulfillment) _____. The Army meets the _____
terms of the informal _____ in two ways: First,
_____ directly satisfies his physical _____.
Second, it gives him _____ chance to satisfy his
_____ needs. When both needs _____ met, you
can then _____ your men to accomplish _____
goals.

Cloze Test on Original
Passage on Endurance

Endurance, the mental and _____ stamina measured by the _____ to withstand pain, fatigue, _____, and hardship, is akin _____ courage. It is an _____ quality of leadership which _____ must have if they _____ to merit the proper _____ from subordinates. Subordinates may _____ a lack of endurance _____ a combat situation as _____. Likewise, the leader's lack _____ endurance makes him a _____ rather than the asset _____ he should be. The _____ sets the standards for _____ unit most effectively by _____. The leader must display _____ acceptable, if not superior, _____ of endurance. He may _____ his endurance and stamina _____ regular participation in strenuous _____ and mental activities. Frequent _____ tests can give the _____ a measure of his _____ level. Self-discipline and fortitude _____ essential in developing and _____ endurance.

Enthusiasm is the _____ of sincere interest and _____ in the performance of _____. This requires the leader _____ be optimistic and cheerful. _____ leader must, therefore, willingly _____ the challenges of his _____ and determine to do

_____ best job possible. This _____, when developed, helps create _____ good unit. Whether in _____ or combat, enthusiastic troops _____ very helpful in accomplishing _____ mission. A most important _____ in instilling enthusiasm in _____ is explaining the "Why" _____ the leader's actions. If _____ believe in, and understand _____ mission, they usually do _____ best to accomplish it. _____ avoid becoming stale, set _____ a brief period daily _____ relax. Capitalize on success. _____ is contagious and nothing _____ develop it more than _____ success of a unit _____ an individual.

Cloze Test on Rewritten
Passage on Endurance

Endurance is mental and _____ stamina. It is measured _____ how you stand-up under _____, fatigue, stress, and hardship. _____ is akin to courage. _____ is an important part _____ leadership. You must have _____ if you hope to _____ the respect of your _____. In combat your lack _____ endurance may be seen _____ cowardice. And, without endurance _____ are a liability, not _____ asset to your unit. _____ unit's standards are set _____ your actions. You must _____ a high level of _____ if you expect the _____ from your men. Develop _____ physically and mentally. Frequent _____ physical and mental activity _____ build your endurance and _____. You should test yourself _____ to measure your endurance. _____ and fortitude are needed _____ develop and maintain endurance.

_____ is showing interest and _____ in your job. An _____ leader must be optimistic _____ cheerful. You should look _____ and accept the challenges _____ your job. Be determined _____ do your best. Enthusiasm _____ to create a good _____. Enthusiastic troops are the

_____ to accomplishing training and _____
missions. Explaining the "Why" _____ your actions to
your _____ is an important step _____
creating enthusiasm. Your men _____ do a better job
_____ they believe in, and _____ their
missions. Avoid becoming _____. A stale leader
is _____ unenthusiastic leader. Take time
_____ day to relax. Relaxing _____ keep you
from becoming _____. Capitalize on success.
Enthusiasm _____ contagious. Nothing will build
_____ more than individual or _____ success.

AD-A053 518

IOWA STATE UNIV AMES

THE EFFECT OF WRITING STYLE AS MEASURED BY THE FLESCH READING E--ETC(U)

1976 R A GRUBB

F/G 5/10

UNCLASSIFIED

NL

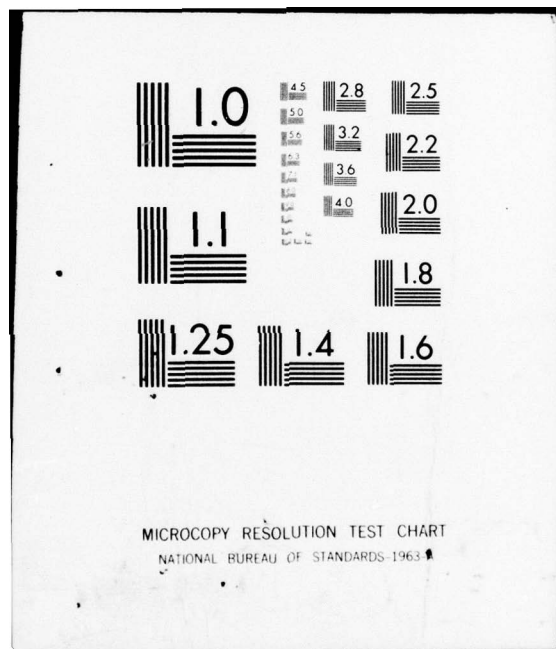
2 OF 2
AD
A053 518



END
DATE
FILMED

6-78

DDC



Cloze Test on Original Passage
On Leadership Style

Styles of leadership vary _____ on the leader's personality, _____ men, and the situation.

_____ has long been a _____ of discussion and consideration _____ men and their leaders _____. Although it is an _____ topic for discussion, in _____ final analysis, the proper _____ for any leader is _____ which helps him lead _____.

Leaders are not restricted _____ any one stereotyped style _____ leadership. In fact, one _____ may, depending on the _____, use an authoritarian style _____ one instance and a _____ style in another.

A _____ authoritarian leader reserves control _____ himself. A democratic leader _____ his men in making _____ decision, but reserves the _____ for himself.

The leader _____ choose the style of _____ which will best assist _____ in mission accomplishment. Before _____ selection is made, however, _____ must realize that he _____ responsible for everything his _____ does or fails to _____. He should, therefore, be _____ to adjust his style _____ on the results he _____. His style is influenced

_____ the many facets of _____ personality,
value system, confidence _____ subordinates,
knowledge, and leadership _____.

His value system will _____ his style selection
because _____ he feels that a _____ should
make all decisions, _____ he will. If he
_____ that subordinates should share _____
making decisions, he will _____ to select a style
_____ supports this value. The _____ of
confidence in his _____ will also influence his
_____. If he has no _____ in his men then
_____ leader will probably not _____ them
in decisions.

Cloze Test on Rewritten Passage
On Leadership Style

Leadership styles vary. The _____ used depends on the _____, the leader, and his _____. Men and their leaders _____ talk about leadership style. _____ is an interesting topic _____ discuss. But, the right _____ for a leader is _____ which helps him lead _____.

There is no one _____ style of leadership. Leaders _____ not limited to only _____ style of leadership. A _____ may use both authoritarian _____ democratic styles of leadership. _____ style used depends on _____ situation.

Authoritarian leaders reserve _____ for themselves. Democratic leaders _____ their men in decision _____, but make the decisions _____.

The leader picks the _____ style that gets the _____ results. The best result _____ to accomplish the mission. _____ he picks a style _____ leader should know that _____ is responsible for everything _____ unit does or fails _____ do. He must be _____ to change his style _____ get the best results. _____ depends on several things. _____ depends on the leader's _____, value system, and knowledge.

_____ also depends on how _____ confidence he has in _____ men. Finally style also _____ on the leader's own _____ as to what a _____ should do.

A leader's _____ system will influence the _____ he uses. If he _____ that he should make _____ the decisions, he will. _____ he feels that his _____ should share in making _____ he will pick a _____ that allows them to. _____ degree of confidence in _____ men will also affect _____ style. A leader who _____ no faith in his _____ usually will not involve _____ in decisions.

APPENDIX D: SURVEY QUESTIONNAIRE

Copy of Survey Questionnaire
Completed By Each Test Subject

Please place an "X" beside the answer you select. You may turn back to pages 1 through 4 while answering questions C1 through C6.

C1. In your opinion, which page was the easiest for you to read?

- ☐ page 1
- ☐ page 2
- ☐ page 3
- ☐ page 4

C2. In your opinion, which page was the hardest for you to read?

- ☐ page 1
- ☐ page 2
- ☐ page 3
- ☐ page 4

C3. In your opinion, which page was the second hardest to read?

- ☐ page 1
- ☐ page 2
- ☐ page 3
- ☐ page 4
- ☐ Don't know/Undecided

C4. In your opinion, which page did you have the least difficulty completing?

- ☐ page 1
- ☐ page 2
- ☐ page 3
- ☐ page 4

C5. In your opinion, which page did you have the most difficulty completing?

- ☐ page 1
- ☐ page 2
- ☐ page 3
- ☐ page 4

C6. In your opinion, which page was the next most difficult for you to complete?

- ☐ page 1
☐ page 2
☐ page 3
☐ page 4
☐ Undecided/Don't know

The next five questions deal with your experience as a leader or a supervisor. For the purposes of this questionnaire a leadership/supervisory position means: That the job you held, hold now, or want to hold involves the supervision of people. This supervision must be a part of the job. It must also be done on a regular basis. And this type of job also means that you are responsible for the work that the people under you do.

C7. Have you ever held a leadership/supervisory position in the National Guard?

- ☐ Yes
☐ No (If No, please skip the next question)

C8. Do you now hold a leadership/supervisory position in the National Guard?

- ☐ Yes
☐ No

C9. If you had the opportunity, would you take a leadership/supervisory position in the National Guard?

- ☐ Yes
☐ No
☐ Don't know/Undecided

C10. Have you ever held a leadership/supervisory position in your civilian job?

- ☐ Yes
☐ No (If No, please skip the next question)

C11. Do you now hold a leadership/supervisory position in your civilian job?

- ☐ Yes
☐ No.

C12. If you had the opportunity, would you take a leadership/supervisory position in your civilian job?

☐ Yes
☐ No
☐ Don't know/Undecided

C13. On an average day how much time do you spend reading for your job? That is, how much time do you spend reading memos, letters, reports, instructions, manuals, magazines, or books related to work?

<input type="checkbox"/> Almost None	<input type="checkbox"/> 4 hours
<input type="checkbox"/> 1 hour	<input type="checkbox"/> 5 hours
<input type="checkbox"/> 2 hours	<input type="checkbox"/> More than 5 hours
<input type="checkbox"/> 3 hours	

C14. On an average day how much time do you spend reading newspapers?

<input type="checkbox"/> Almost None	<input type="checkbox"/> 46-60 minutes
<input type="checkbox"/> Less than 15 minutes	<input type="checkbox"/> 1-2 hours
<input type="checkbox"/> 16-30 minutes	<input type="checkbox"/> More than 2 hours
<input type="checkbox"/> 31-45 minutes	

C15. During an average week how much time do you spend reading magazines (does not include magazines read for your job)?

☐ Almost None
☐ 1 hour
☐ 2 hours
☐ 3 hours
☐ 4 or more hours

C16. How many books have you read in the last 12 months?

<input type="checkbox"/> None	<input type="checkbox"/> 4 books
<input type="checkbox"/> 1 book	<input type="checkbox"/> 5 books
<input type="checkbox"/> 2 books	<input type="checkbox"/> More than 5 books
<input type="checkbox"/> 3 books	

C17. What is your opinion of Army Field Manuals?

☐ Very hard to read
☐ Hard to read
☐ About right
☐ Easy to read
☐ Very easy to read
☐ Don't know/Undecided

C18. When you read Army Field Manuals do you find words you don't know or understand?

- ☐ Very often
- ☐ Often
- ☐ Sometimes
- ☐ Not very often
- ☐ Don't know/Undecided

C19-20. What is your rank? _____

C21-22. What is your age? _____

C23-24. How many years have you been in the National Guard? _____

C25. How much formal education do you have?

- ☐ 8th grade or less
- ☐ Some high school
- ☐ Graduated from high school/or GED
- ☐ Attended trade school
- ☐ Graduated from trade school
- ☐ Attended college
- ☐ Graduated from college
- ☐ Attended graduate school